

First record of *Siphonops paulensis* Boettger, 1892 (Gymnophiona: Siphonopidae) in the state of Sergipe, northeastern Brazil

Daniel Oliveira Santana^{1*}, Crizanto Brito De-Carvalho², Evellyn Borges de Freitas², Geziana Silva Siqueira Nunes² and Renato Gomes Faria²

1 Universidade Federal da Paraíba, Programa de Pós Graduação em Ciências Biológicas (Zoologia). Cidade Universitária, Avenida Contorno da Cidade Universitária, s/nº, Castelo Branco. CEP 58059-900. João Pessoa, PB, Brazil

2 Universidade Federal de Sergipe, Programa de Pós-graduação em Ecologia e Conservação. Cidade Universitária Prof. José Aloísio de Campos, Avenida Marechal Rondon, s/nº, Jardim Rosa Elze. CEP 49100-000. São Cristóvão, SE, Brazil

* Corresponding author: E-mail: danielbioufs@yahoo.com.br

Abstract: Siphonopidae is represented by 25 caecilians species in South America. In Brazil, *Siphonops paulensis* is found in the states of Maranhão, Rio Grande do Norte, Bahia, Tocantins, Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, São Paulo, Rio de Janeiro, Rio Grande do Sul, and in the Distrito Federal. Herein, we report the first record of *Siphonops paulensis* in the state of Sergipe, Brazil, Simão Dias municipality. This record significantly expands the distribution of the species in northeastern Brazil.

Key words: caecilians, Siphonopidae, geographic distribution, *Siphonops paulensis*, Simão Dias

Siphonopidae is represented by 25 species in South America, being widely distributed in the continent, occurring in Argentina, Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, and Venezuela (Dunn 1942; Taylor 1968; Lynch 1999; Frost 2014).

In Brazil, the genus *Siphonops* is represented by five species: *Siphonops annulatus* (Mikan, 1820); *Siphonops hardyi* Boulenger, 1888; *Siphonops insulanus* Ihering, 1911; *Siphonops leucoderus* Taylor, 1968; and, *Siphonops paulensis* Boettger, 1892. *Siphonops paulensis* Boettger, 1892 is found in Argentina, Bolivia, Brazil, Paraguay and Uruguay (Taylor 1968; Aquino *et al.* 2004).

Siphonops paulensis was described from São Paulo municipality, state of São Paulo by Boettger (1892). Currently, it is registered in the states of Maranhão (Miranda *et al.* 2013), Rio Grande do Norte (Schmidt and Inger 1951), Tocantins (Valdujo *et al.* 2011), Goiás (Schwartz *et al.* 2003; Vaz-Silva *et al.* 2007; Cintra *et al.* 2009; Souza *et al.* 2002), Mato Grosso (Faria and Mott 2011), Mato Grosso do Sul (Dunn 1942; Silva-Júnior *et al.* 2009), Minas Gerais (Kokubum and Menin, 2001), São Paulo (Dunn 1942; Forlani *et al.* 2010), Rio de Janeiro (Sawaya 1937), Rio Grande do Sul (Braun and Braun 1980; Lema and Martins 2011), and in the Distrito Federal (Kokubum and Menin 2001). *Siphonops paulensis* is a subterranean species living in forest, savannahs, shrubland and grassland. It adapts well to anthropogenic disturbance, and has

even been found in urban gardens. It is oviparous with terrestrial eggs and direct development, and not dependent on water for breeding (Aquino *et al.* 2004). We present a distribution map (Figure 1) and data in Table 1 of the current known distribution of this species based on literature.

Herein, we report the first record of *Siphonops paulensis* (Figure 2) for the state of Sergipe, Brazil. The observation occurred on 28 February 2009. The casual encounter was made in municipality of Simão Dias (10°44'20" S, 037°48'36" W; 250 m above sea level) (Figure 1). The specimen of *Siphonops paulensis* (SVL: 340.02 mm) was collected in vicinities city, was fixed in 10% formalin and preserved in 70% alcohol, and deposited in the Herpetological Collection of the Universidade Federal de Sergipe (CHUFS - Voucher Coo378), São Cristóvão municipality, Sergipe state, Brazil.

The specimen was collected under the license permit

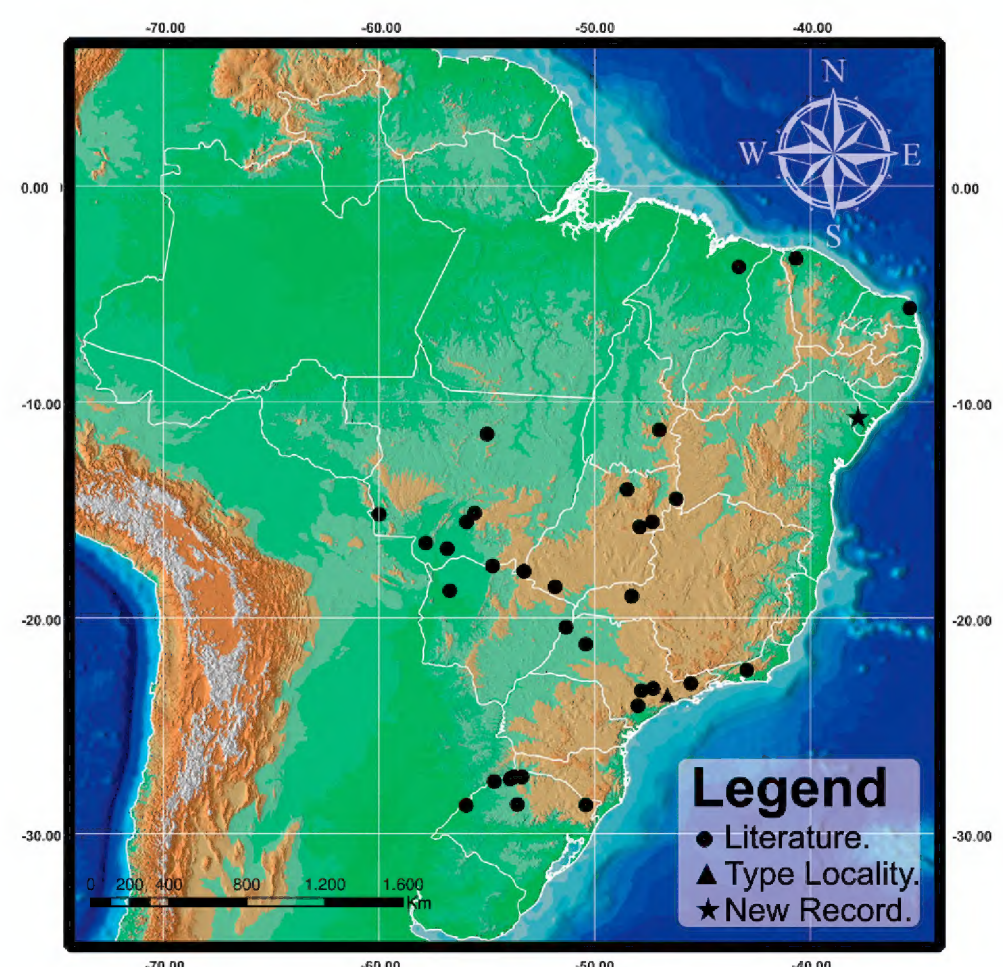


Figure 1. Geographic distribution of *Siphonops paulensis* in Brazil.

Table 1. Localities of the known distribution of *Siphonops paulensis* in Brazil.

| State | Municipality | Latitude (S) | Longitude (W) | Reference |
|---------------------|----------------------------------|--------------|---------------|--------------------------------------|
| Ceará | Ibiapaba | 03°20'00" | 040°42'00" | Loebmann and Haddad (2010) |
| Distrito Federal | Brasília | 15°46'47" | 047°55'47" | Kokubum and Menin (2001) |
| Goiás | Formosa | 15°32'14" | 047°20'04" | Schwartz et al. (2003) |
| Goiás | Aporé | 18°40'26" | 051°52'50" | Vaz-Silva et al. (2007) |
| Goiás | Mambai | 14°21'15" | 046°11'40" | Cintra et al. (2009) |
| Goiás | Minaçu | 14°00'30" | 048°24'53" | Souza et al. (2002) |
| Maranhão | Chapadinha | 03°44'41" | 043°19'36" | Miranda et al. (2013) |
| Mato Grosso | Alto Taquari | 17°49'40" | 053°17'38" | Faria and Mott (2011) |
| Mato Grosso | Cáceres | 16°30'59" | 057°50'12" | Faria and Mott (2011) |
| Mato Grosso | Chapada dos Guimarães | 15°06'25" | 055°32'22" | Faria and Mott (2011) |
| Mato Grosso | Cláudia | 11°26'46" | 055°02'57" | Faria and Mott (2011) |
| Mato Grosso | Cuiabá | 15°28'48" | 055°53'21" | Faria and Mott (2011) |
| Mato Grosso | Poconé | 16°47'04" | 056°56'54" | Faria and Mott (2011) |
| Mato Grosso | Vila Bela da Santíssima Trindade | 15°11'15" | 059°58'58" | Faria and Mott (2011) |
| Mato Grosso do Sul | Sonora | 17°34'47" | 054°44'37" | Silva et al. (2009) |
| Mato Grosso do Sul | Corumbá | 18°43'51" | 056°43'23" | Dunn (1942) |
| Minas Gerais | Uberlândia | 18°59'00" | 048°18'00" | Kokubum and Menin (2001) |
| Rio de Janeiro | Teresópolis | 22°24'44" | 042°57'59" | Sawaya (1937) |
| Rio Grande do Norte | Ceará Mirim | 05°38'07" | 035°25'13" | Schmidt and Inger (1951) |
| Rio Grande do Sul | Frederico Westphalen | 27°21'27" | 053°23'40" | Lema and Martins (2011) |
| Rio Grande do Sul | Porto Mauá | 27°34'12" | 054°39'55" | Species Link |
| Rio Grande do Sul | Três Passos | 27°27'31" | 053°55'49" | Species Link |
| Rio Grande do Sul | Bom Jesus | 28°40'09" | 050°26'05" | Species Link |
| Rio Grande do Sul | Tenente Portela | 27°22'15" | 053°45'28" | Braun and Braun (1980) |
| Rio Grande do Sul | Cruz Alta | 28°38'22" | 053°36'22" | Braun and Braun (1980) |
| Rio Grande do Sul | São Borja | 28°40'58" | 055°58'39" | Braun and Braun (1980) |
| São Paulo | São Miguel Arcanjo | 24°03'00" | 047°56'00" | Forlani et al. (2010) |
| São Paulo | Itú | 23°15'57" | 047°17'57" | Species Link |
| São Paulo | Tatuí | 23°21'00" | 047°51'00" | Species Link |
| São Paulo | Taubaté | 23°01'51" | 045°32'54" | Dunn (1942) |
| São Paulo | Ilha Solteira | 20°25'52" | 051°20'17" | Species Link |
| São Paulo | Araçatuba | 21°12'41" | 050°25'34" | Species Link |
| São Paulo | São Paulo | 23°32'51" | 046°38'10" | Boettger (1892) <i>Type Locality</i> |
| Tocantins | Almas | 11°16'00" | 047°00'00" | Valdujo et al. (2011) |
| Sergipe | Simão Dias | 10°44'20" | 037°48'36" | New Record |

#10504-1 granted by the Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA).

The specimen had their identification confirmed based on absence of splenial teeth, eye more or less distinct, in a socket, its orbits continuous with the tentacular groove, its distance from nostril more than three times as far as its distance from eye. The eyes are rather indistinct but visible as grayish-white spots. The head is short, the snout is oval, and body is plump and subcylindrical. Terminal part of body unsegmented, color slate, based on the description of Taylor (1968). The number of annuli following the collars is 114. According to Taylor (1968) *S. paulensis* presents variation of from 101 to 118 annuli. The nomenclature used in this study follows the taxonomy suggested by Segalla et al. (2013).

Our record extends the geographic distribution of *Siphonops paulensis* by about 1,700 km northeast of its type locality and 630 km from the nearest locality in municipality of Ceará Mirim, Rio Grande do Norte state (Schmidt and Inger 1951). The new record reported in this study fills a distributional gap of the poorly known *S. paulensis* in northeastern Brazil.

ACKNOWLEDGMENTS

We sincerely thank to Universidade Federal de Sergipe for logistic. Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), and Coordenação de Aperfeiçoamento

de Pessoal de Nível Superior (CAPES) for fellowships. We also thank the anonymous reviewer for comments and suggestions in this manuscript.



Figure 2. *Siphonops paulensis* (C00378). Photo by Crizanto Brito De-Carvalho.

LITERATURE CITED

- Aquino, L., S. Reichle, G.R. Colli, N. Scott, J. Faivovich, M. Wilkinson and J. Measey. 2004. *Siphonops paulensis*. In IUCN 2012 IUCN Red List of Threatened Species. Version 2012.2. Electronic Database accessible at <http://www.iucnredlist.org>. Captured on 17 January 2014.
- Braun, P.C. and C.A.S. Braun. 1980. Lista prévia dos anfíbios do Estado do Rio Grande do Sul, Brasil. *Iheringia Série Zoologia* 56: 121–146.
- Cintra, C.E.D., H.L.R., Silva and N.J. Silva-Júnior. 2009. Herpetofauna, Santa Edwiges I and II hydroelectric power plants, state of Goiás, Brazil. *Check List* 5(3): 570–576. (<http://www.checklist.org.br/getpdf?SL113-08>).
- Dunn, E.R. 1942. The American caecilians. *Bulletin of the Museum of Comparative Zoology* 91: 437–540 (<http://biodiversitylibrary.org/page/4788854>).
- Faria, H.A.B. and T. Mott. 2011. Geographic distribution of caecilians (Gymnophiona, Amphibia) in the state of Mato Grosso, Brazil with a new state record for *Caecilia mertensi* Taylor 1973. *Herpetology Notes* 4: 053–056. (http://www.herpetologynotes.seh-herpetology.org/Volume4_PDFs/Faria&Mott_Herpetology_Notes_Volume4_pages053-056.pdf).
- Forlani, M.C., P.H. Bernardo, C.B.F. Haddad and H. Zaher. 2010. Herpetofauna do Parque Estadual Carlos Botelho, São Paulo, Brasil. *Biota Neotropica* 10(3): 265–309. (<http://www.biotaneotropica.org.br/v10n3/en/abstract?inventory+bn00210032010>).
- Frost, D.R. 2014. *Amphibian Species of the World: an Online Reference*. Version 5.6 (9 January, 2013). New York: American Museum of Natural History. Accessible at <http://research.amnh.org/vz/herpetology/amphibia>. Captured on 17 April 2014.
- Kokubum, M.N.C. and M. Menin, 2001. Geographic Distribution. *Siphonops paulensis*. *Herpetological Review* 32(1): 53–53.
- Lema, T. and L.A. Martins. 2011. *Anfíbios do Rio Grande do Sul. Catálogo, Diagnose, Distribuição e Iconografia*. Porto Alegre: ediPUCRGs. 196 pp.
- Lynch, J.D. 1999. Una aproximacion a las cuebras ciegas de Colombia (Amphibia: Gymnophiona). *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* 23: 317–337. (http://www.accefyn.org.co/revista/Vol_23/supl/317-337.pdf).
- Miranda, J.P., R.F. Matos, F.M. Scarpa and C.F.D. Rocha. 2013. New record and distribution extension of *Siphonops paulensis* (Gymnophiona: Siphonopidae) in the state of Maranhão, Northeastern Brazil. *Herpetology Notes* 6: 327–329. (http://www.herpetologynotes.seh-herpetology.org/Volume6_PDFs/Miranda_HerpetologyNotes_volume6_pages327-329.pdf).
- Sawaya, P. 1937. Sobre o gênero *Siphonops* Wagler 1828- Amphibia-Apoda- com descrição de duas variedades novas: *S. annulatus* (Mikan) var. *marmoratus* e *S. paulensis* Boettg. var. *maculatus*. *Boletim da Faculdade de Filosofia Ciências e Letras da Universidade de São Paulo* 1: 225–263.
- Schmidt, K.E. and R.F. Inger. 1951. Amphibians and reptiles of the Hopkins–Branner expedition to Brazil. *Fieldiana, Zoology* 31(42): 439–465 (<http://biodiversitylibrary.org/page/2826872>).
- Schwartz, E.F., A. Stucchi-Zucchi, C.A. Schwartz and L.C. Salomão. 2003. Skin secretion of *Siphonops paulensis* (Gymnophiona, Amphibia) forms voltage-dependent ionic channels in lipid membranes. *Brazilian Journal of Medical and Biological Research* 36: 1279–1282. (doi: 10.1590/S0100-879X2003000900020).
- Silva-Júnior, N.J., C.E.D. Cintra, H.L.R. Silva, M.C. Costa, C.A. Souza, A.A. Pachêco-Júnior, F.A. Gonçalves. 2009. Herpetofauna, Ponte de Pedra Hydroelectric Power Plant, states of Mato Grosso and Mato Grosso do Sul, Brazil. *Check List* 5(3): 518–525. (<http://www.checklist.org.br/getpdf?SL114-08>).
- Souza, I.F., H.L.R. Silva and N.J. Silva Jr. 2002. Geographic Distribution. *Siphonops paulensis*. *Herpetological Review* 33(2): 146–47.
- Taylor, E.H. 1968. *The Caecilians of the World. A Taxonomic Review*. Lawrence. University of Kansas Press. 122 pp.
- Valdujo P.H., A. Camacho, R.S. Recoder, M. Teixeira Jr., J.M.B. Ghellere, T. Mott, P.M.S. Nunes, C. Nogueira and M.T. Rodrigues. 2011. Anfíbios da Estação Ecológica Serra Geral do Tocantins, região do Jalapão, Estados do Tocantins e Bahia. *Biota Neotropica* 11: 251–262. (<http://www.biotaneotropica.org.br/v11n1/pt/abstract?article+bn03511012011>).
- Vaz-Silva, W., A.G. Guedes, P.L. Azevedo-Silva, F.F. Gontijo, R.S. Barbosa, G.R. Aloísio and F.C.G. Oliveira. 2007. Herpetofauna, Espora Hydroelectric Power Plant, state of Goiás, Brazil. *Check List* 3(4): 338–345 (<http://www.checklist.org.br/getpdf?SL018-07>).

Authors' contribution statement: DOS, CBC, EBF and RGF wrote the text, GSSN collected the data.

Received: September 2014

Accepted: November 2014

Editorial responsibility: Natan Medeiros Maciel